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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,847	10/20/2003	Robert A. August	NC 84,355	7110

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EXAMINER

MALEVIC, DJURA

ART UNIT PAPER NUMBER

2878

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/693,847

Applicant(s)

AUGUST ET AL.

Examiner

Djura Maljevic

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[Handwritten signature]

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 11-20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/13/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2 and 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Hossain et al. (US Patent 6,075,261).

Regarding claim 1, Hossain discloses a neutron detection device (Fig 1a –1e) comprising an active semiconductor layer including a plurality of charge-sensitive cells 103; and a neutron conversion layer 121 located in close proximity to said cells.

Regarding claim 2, Hossain discloses an insulating layer 119 between the active semiconductor layer and the neutron conversion layer (Col. 2, Line 60) (Claim 23).

Regarding claims 5 and 8, Hossain discloses that suitable neutron-reactive elements include Boron and Lithium (Col. 3, Line 2).

Regarding claim 6, Hossain discloses that the conversion layer comprises Borophosphosilicate glass.

Regarding claim 7, Hossain discloses that the concentrations of Boron in Borophosphosilicate glass fall in the range of 80 to 100 percent.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossain in view of Brandl et al. (US Pub. 2005/0067695 A1).

Regarding claims 3 and 4, Hossain discloses the invention according to claim 1, but does not expressly disclose a barrier layer located between the neutron conversion layer and the active semiconductor layer. Brandl discloses that a barrier layer is formed between the integrated circuit and the metal layer (between the neutron conversion layer and the active semiconductor layer), which prevents diffusion of atoms from the metal layer (lithium) into the integrated circuit (semiconductor layer) [0019]. Brandl also discloses that the barrier layer may be made of silicon nitride, which limits dispersion of atoms of the metal layer into the sensor element [0045]. Hossain and Brandl are analogous art because they both work on semiconductor sensors.

It would have been obvious at the time the invention was made to modify Hossain to include a barrier layer such as that taught by Brandl in order to prevent diffusion of atoms from the metal layer (lithium) into the integrated circuit (semiconductor layer) [0019].

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossain in view of Kurkoski et al. (US Pub. 20040178337 A1).

Regarding claim 9, Hossain discloses the claim invention according to claim 1, but does not expressly disclose the neutron detection device further comprising a second neutron conversion layer. Kurkoski discloses that a neutron detector conversion layer is preferably manufactured to comprise multiple layers to provide good capture as neutrons strike the planar sensing surface [0057]. Hossain and Kurkoski are analogous art because they both are concerned with neutron detection.

It would have been obvious at the time the invention was made to modify Hossain to include multiple neutron conversion layers such as that taught by Kurkoski in order to provide good capture as neutrons strike the planar sensing surface.

Regarding claim 10, Hossain discloses the claim invention according to claim 9, but does not expressly disclose the two conversion layers comprising unlike compounds specifically, one conversion layer comprising boron and the other comprising lithium. Kurkoski discloses that a neutron detector conversion layer is preferably manufactured to comprise multiple layers to provide good capture as neutrons strike the planar sensing surface [0057].

It would have been obvious at the time the invention was made to modify Hossain to include any combination of elements disclosed by Hossain as suitable neutron conversion layers (Boron and Lithium; Col. 3, Line 3) therefore, including one layer of boron and one layer of lithium for multiple neutron layers, such as that taught by

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Kurkoski that multiple layers of the neutron conversion material provides good capture as neutrons strike the planar sensing surface.

Allowable Subject Matter

Claims 11- 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 11 and 16, the prior art of record does not suggest or teach a method of manufacturing a neutron detector from a memory device, wherein the steps comprise: removing the base substrate layer from a memory device to expose the insulating layer and forming a neutron conversion layer on the insulating layer.

Although, references like Hossain discloses a method of forming a neutron-reactant material over one or more memory cells. Hossain shows no concern nor suggests any modifications for removing the base substrate layer from a memory device to expose the insulating layer and forming a neutron conversion layer on the insulating layer.

Claims 12-15 are allowed because they further limit claim 11.

Claims 17-20 are allowed because they further limit claim 16.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Djura Malevic whose telephone number is (571) 272-5975. The examiner can normally be reached on Monday – Friday between 8:30am – 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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OTILIA GABOR
PRIMARY EXAMINER